(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 447 173 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.05.2012 Bulletin 2012/18

(21) Application number: **10189680.1**

(22) Date of filing: **02.11.2010**

(51) Int Cl.:
B65C 9/00 *(2006.01)* ***F26B 3/347*** *(2006.01)*
F26B 15/04 *(2006.01)* ***F26B 15/18*** *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Boido, Stefano**
14042 Calamandrana (Asti) (IT)

(72) Inventor: **Boido, Stefano**
14042 Calamandrana (Asti) (IT)

(74) Representative: **Marchitelli, Mauro**
Via Maria Vittoria 18
10123 Torino (IT)

(54) **Apparatus for heating containers**

(57) An apparatus for heating containers (B), comprising a plurality of microwave heating units (24), wherein each of said microwave heating units (24) comprises a heating chamber (28) and a microwave generator (32) connected to a waveguide (34), which communicates with the respective heating chamber (28), wherein each of said heating chambers (28) has a lid (44) associated to an opening and closing mechanism (46), which comprises:
- a pair of plates (52), fixed to said rear wall (42) and having respective guides (54);
- a carriage (60), fixed to said lid (44) and engaged slidably in said guides; and
- a linear actuator (64) extending in a vertical direction and having a first end articulated to said carriage (60) and a second end articulated to said rear wall (42).

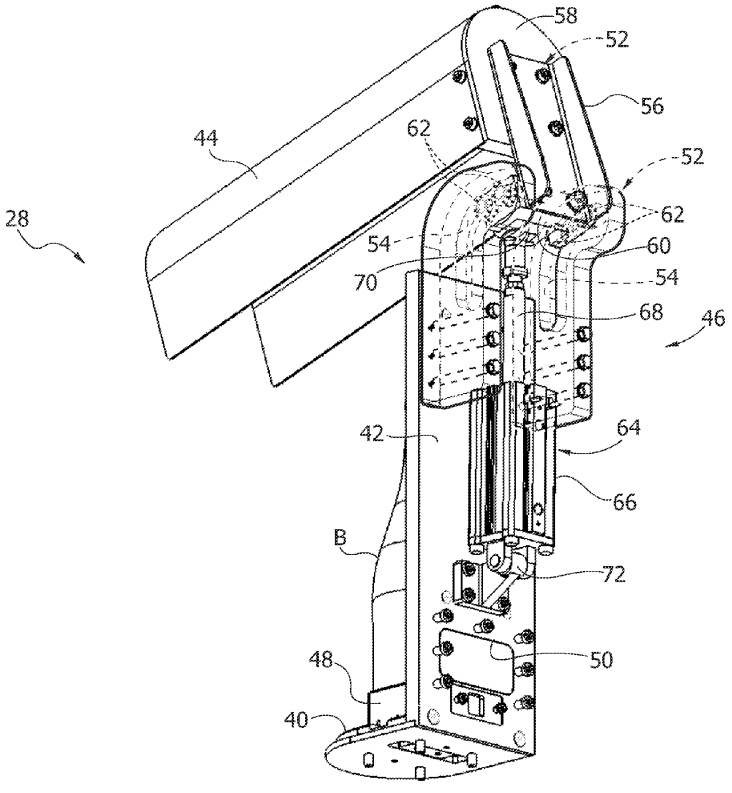


FIG. 6

EP 2 447 173 A1

Description

Field of the invention

[0001] The present invention relates in general to systems for filling and closing containers and regards in particular an apparatus for heating containers.

[0002] The present invention has been developed with particular reference to its application to winebottling plants. The present invention can, however, be applied in general to systems for filling and closing containers of different shapes and materials, such as for example glass, plastic, etc., that contain liquid or solid products of various types, of a foodstuff or non-foodstuff nature.

Description of the known art

[0003] Wines are normally bottled at low temperature, usually in the region of 1-3°C.

[0004] Downstream of the bottling station, on account of the low temperature, on the outer surface of the bottles a layer of condensate is formed. The layer of condensate would render very problematical the application of the labels on the bottles.

[0005] In bottling plants with high production capacity an apparatus for heating the bottles is usually provided set between an apparatus for filling/closing the bottles and a labelling apparatus.

[0006] The document No. W02009/001208 describes a microwave heating apparatus according to the preamble of Claim 1, comprising an input station, a carousel structure, which turns about a vertical axis and carries a plurality of microwave heating devices, and an output station. Each of said microwave heating devices comprises an openable heating chamber, designed to receive a respective bottle, and a microwave generator, arranged for conveying a microwave flow in said heating chamber.

[0007] In an apparatus of this type, it is necessary to carry out opening and closing of the heating chamber in a fast way since the time necessary for carrying out opening and closing of the chamber reduces the time available for the cycle for heating the bottles. It is moreover advisable for the mechanism for controlling opening and closing of the chamber to be compact, simple, and inexpensive.

Object and summary of the invention

[0008] The object of the present invention is to provide a system for opening and closing the heating chambers that is fast, has reduced overall dimensions, and is made up of a small number of components.

[0009] According to the present invention, the above object is achieved by an apparatus having the characteristics forming the subject of Claim 1.

[0010] The claims form an integral part of the teaching provided in relation to the invention.

Brief description of the drawings

[0011] The characteristics and advantages of the present invention will emerge clearly from the ensuing detailed description, which is provided purely by way of nonlimiting example, with reference to the attached drawings, in which:

- Figure 1 is a perspective view of an apparatus according to the present invention;
- Figure 2 is a side view of a heating unit indicated by the arrow II in Figure 1;
- Figure 3 is a perspective view of a heating chamber indicated by the arrow III in Figure 2;
- Figure 4 is a side view of a heating chamber with the lid in the open position; and
- Figures 5 and 6 are partially see-through perspective views illustrating operation of the device that controls opening and closing of the lid of the heating chamber.

Detailed description of an embodiment of the invention

[0012] With reference to Figure 1, designated by 10 is an apparatus for heating bottles according to the present invention. The apparatus 10 comprises a carousel structure 12 that can turn about a vertical axis, an input station 14 associated to an input conveyor 16, and an output station 18 associated to an output conveyor 20.

[0013] The carousel structure 12 comprises a rotating supporting base 22, which carries a plurality of heating units 24 arranged according to a radial configuration.

[0014] The carousel structure 12 moreover carries a plurality of electric power supplies 26, which are electrically connected to a power-supply and control board 27 by means of a rotary collector. Also the power supplies are arranged according to a radial configuration. Each electric-power supply 26 is associated to one or more heating units 24. In the example illustrated, each power supply 26 is associated to two heating units 24.

[0015] With reference to Figure 2, each heating unit 24 comprises an openable heating chamber 28, designed to receive a respective bottle B. Each heating unit 24 comprises a respective microwave generator 32, electrically connected to the respective power supply 26. The microwave generator 32 is connected to a waveguide 34, which conveys the microwave flow produced by the generator 32 into the heating chamber 28. On the waveguide 34 there may be provided a circulator 36, which protects the generator 32 from the return waves, and a tuner 38, which enables tuning of the microwave flow on the load to be heated.

[0016] With reference to Figure 3, each heating chamber 28 comprises a horizontal resting base 40, on which a respective bottle B is to rest, a rear wall 42, which extends in a vertical plane orthogonal to the resting base 40, and an openable lid 44, controlled by an opening and closing mechanism 46. The heating chamber 28 further comprises a positioning wall 48, which serves as refer-

ence for defining the right position of the bottle B with respect to the heating chamber 28. The positioning wall 48 extends upwards from the base 40 and preferably in a vertical plane. The positioning wall 48 is preferably adjustable in a horizontal direction A orthogonal to the plane of the wall 48.

[0017] The rear wall 42 of the heating chamber 28 has an opening 50, connected to which is an end of the waveguide 34. The opening 50 is set in the proximity of the base 40 in such a way that said opening always faces the wall of a bottle B, also in the case of bottles of small format.

[0018] The rear wall 42, the lid 44, and the base 40 are made of a material that provides shielding from microwaves, typically metal (for example steel), and in the closed position of the lid 44 form a microwave shield closed around the bottle B.

[0019] With reference to Figures 4, 5 and 6, the opening and closing mechanism 46 comprises two plates 52 fixed to the rear wall 42. The plates 52 have respective guides 54 substantially shaped like a J turned upside down. The guides 54 have respective vertical bottom stretches and respective curved top stretches.

[0020] The lid 44 is substantially U-shaped in cross section. The lid 44 is opened at its bottom end and has a top end closed by a top wall 58. The lid 44 is carried by a flange 56, fixed to the top wall 58.

[0021] The flange 56 is fixed to a carriage 60, which slidably engages the guides 54. In the example illustrated, the carriage 60 carries two pairs of wheels 62, which are idle about respective horizontal axes and engage respective guides 54. Alternatively, the carriage could be equipped with sliding blocks that engage the guides 54.

[0022] The opening and closing mechanism 46 comprises a linear actuator 64, for example a compressed-air actuator, having a body 66 and a stem 68. The actuator 64 is set with its own axis vertical and has a top end articulated to a first bracket 70 fixed to the flange 56, and a bottom end articulated to a second bracket 72, fixed to the rear wall 42.

[0023] As illustrated in Figure 5, when the actuator 64 is in the retracted position the wheels 62 of the carriage 60 engage the bottom end of the guides 54. In this position the lid 44 is closed.

[0024] When the actuator 64 is in the extended position, as illustrated in Figure 6, the wheels 62 of the carriage 60 engage the arched top part of the guides 54. In this position the lid 44 is open.

[0025] The shape of the guides 54 allows the lid 44 to be displaced from the open position to the closed position with a relatively short travel of the actuator 64. This renders the manoeuvre of opening and closing particularly fast. Furthermore, the opening and closing mechanism 46 is compact, sturdy, and made up of only a small number of components.

Claims

1. An apparatus for heating containers (B), comprising a plurality of microwave heating units (24), wherein each of said microwave heating units (24) comprises a heating chamber (28) designed to receive a respective container (B) and a microwave generator (32) connected to a waveguide (34), which communicates with the respective heating chamber (28), wherein each of said heating chambers (28) has a base (40), on which a respective container (B) is to rest, a rear wall (42), which extends upwards from said base (40), and a lid (44), associated to an opening and closing mechanism (46) designed to displace the lid (44) between an open position for insertion and removal of the containers (B) and a closed position for microwave heating of the containers (B), said apparatus being **characterized in that** said opening and closing mechanism (46) comprises:

   - a pair of plates (52), fixed to said rear wall (42) and having respective guides (54);
   - a carriage (60), fixed to said lid (44) and slidably engaged in said guides; and
   - a linear actuator (64), extending in a vertical direction and having a first end articulated to said carriage (60) and a second end articulated to said rear wall (42).

2. The apparatus according to Claim 1, **characterized in that** said guides (54) are substantially shaped like a reversed J, with respective bottom rectilinear stretches oriented vertically and respective arched top stretches.

3. The apparatus according to Claim 1 or Claim 2, **characterized in that** said carriage has two pairs of wheels (62) that engage respective guides (54).

4. The apparatus according to any one of the preceding claims, **characterized in that** said carriage (60) is fixed to a flange (56), which is in turn fixed to a top wall (58) of said lid (44).

FIG. 1

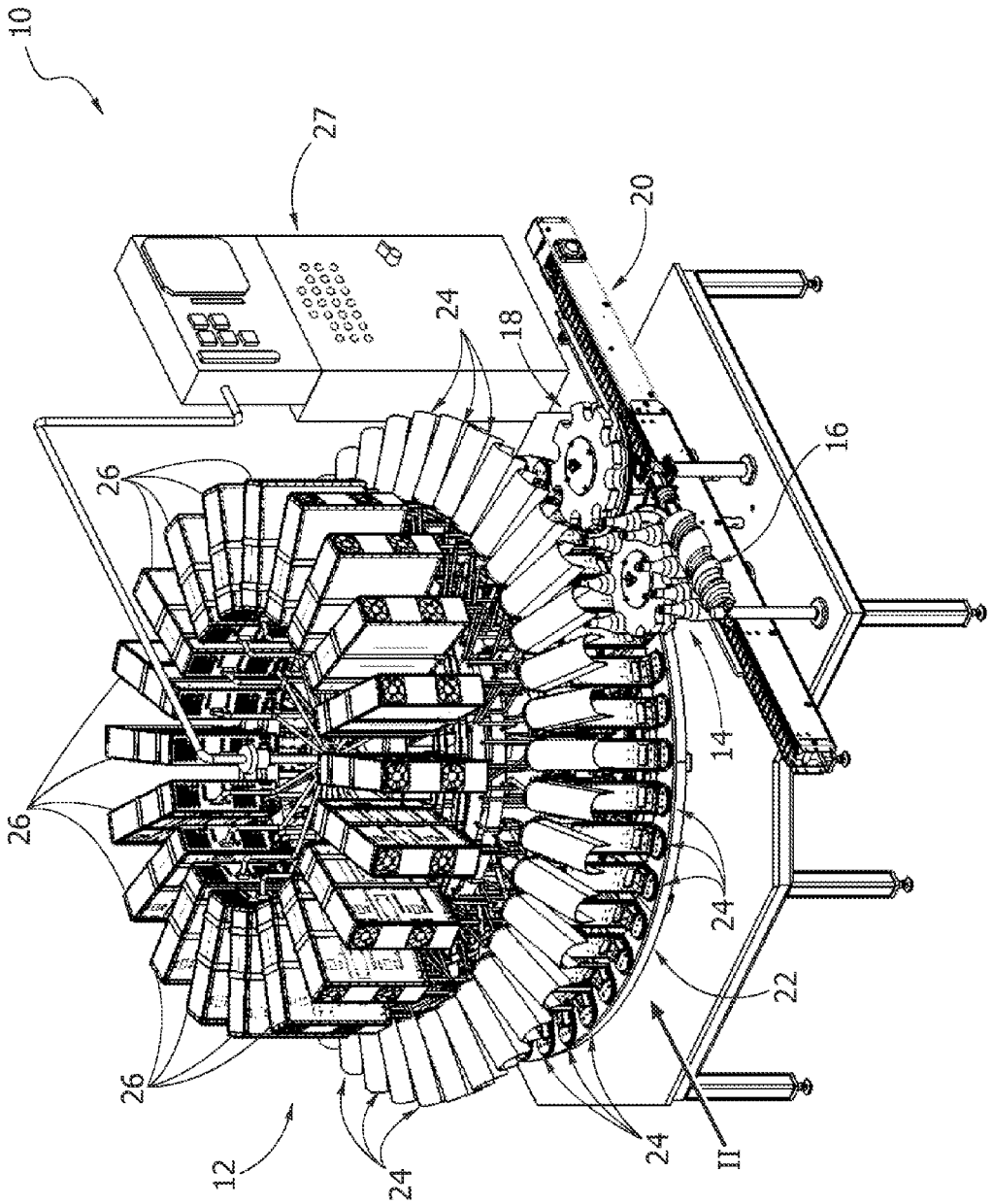


FIG. 2

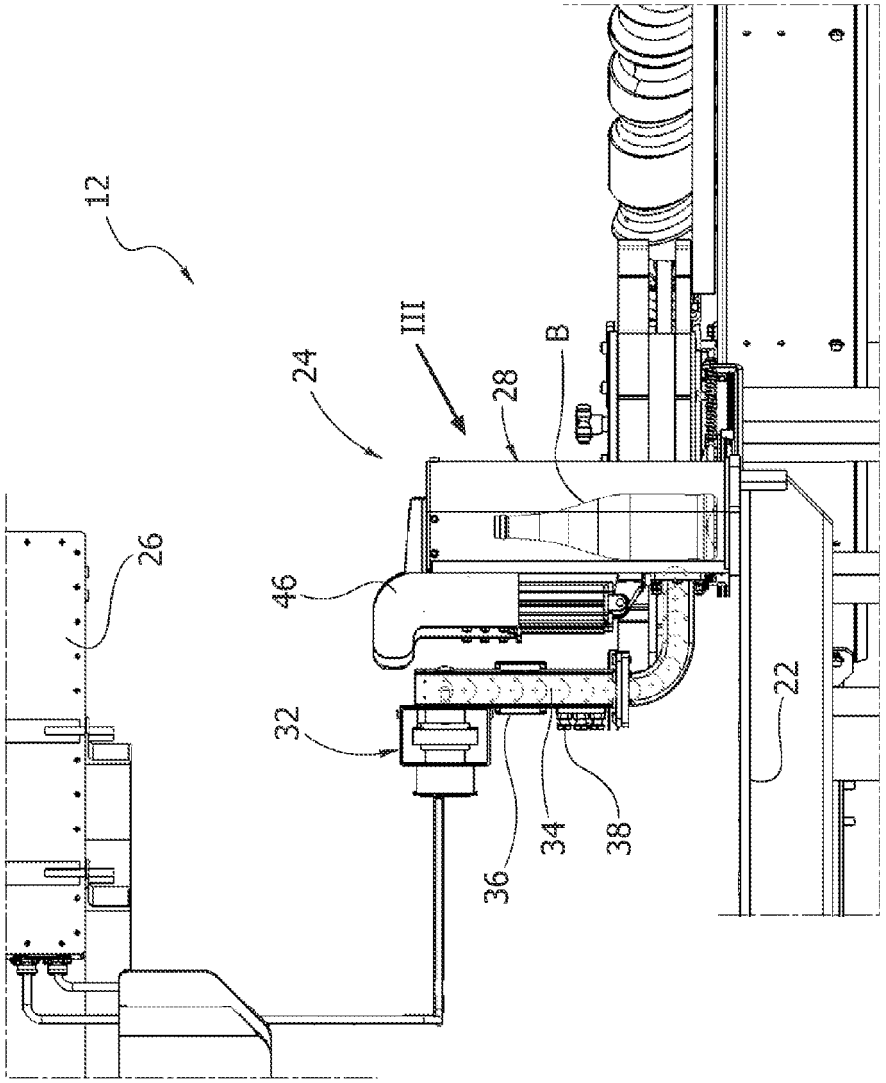


FIG. 3

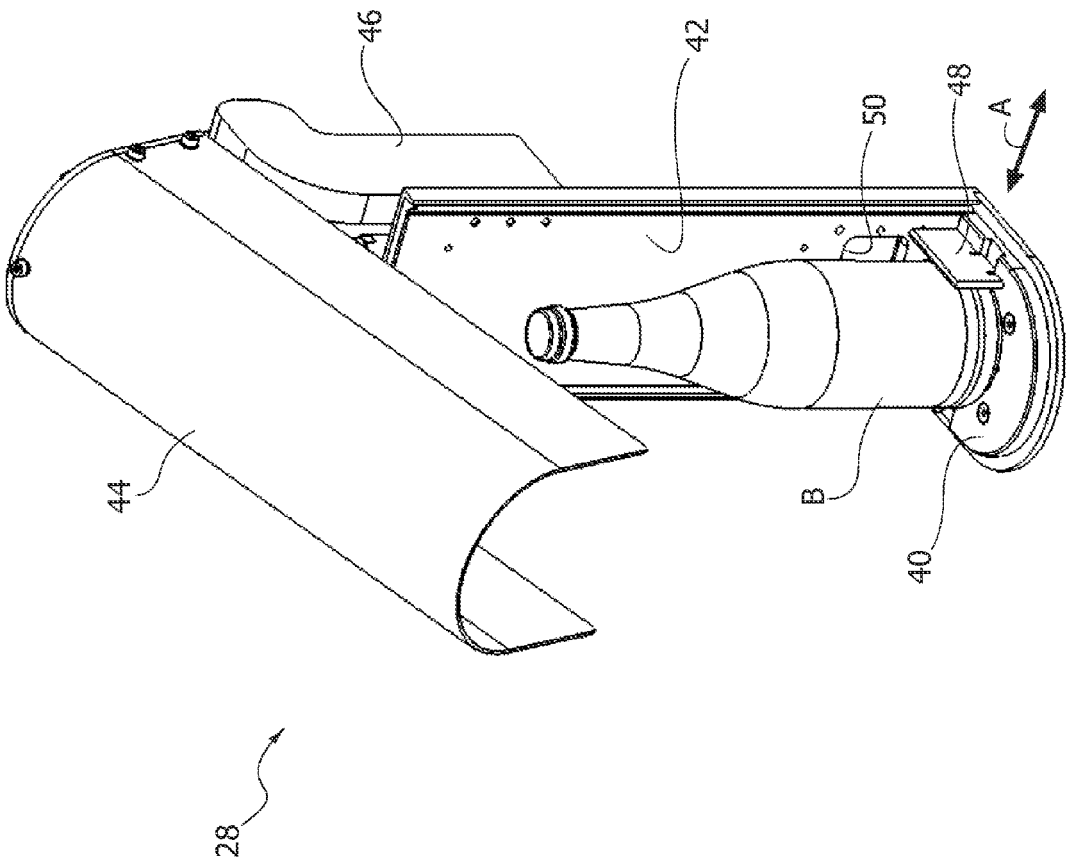


FIG. 4

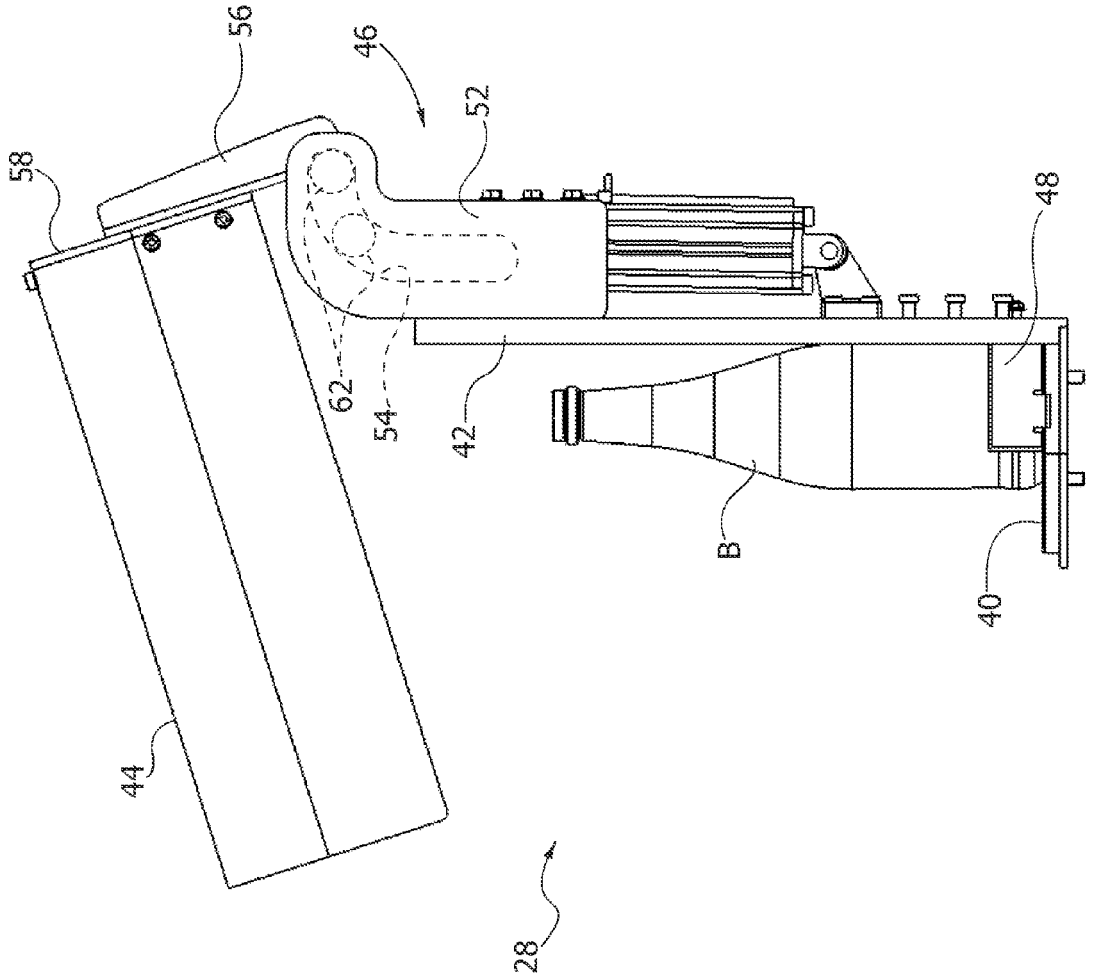


FIG. 5

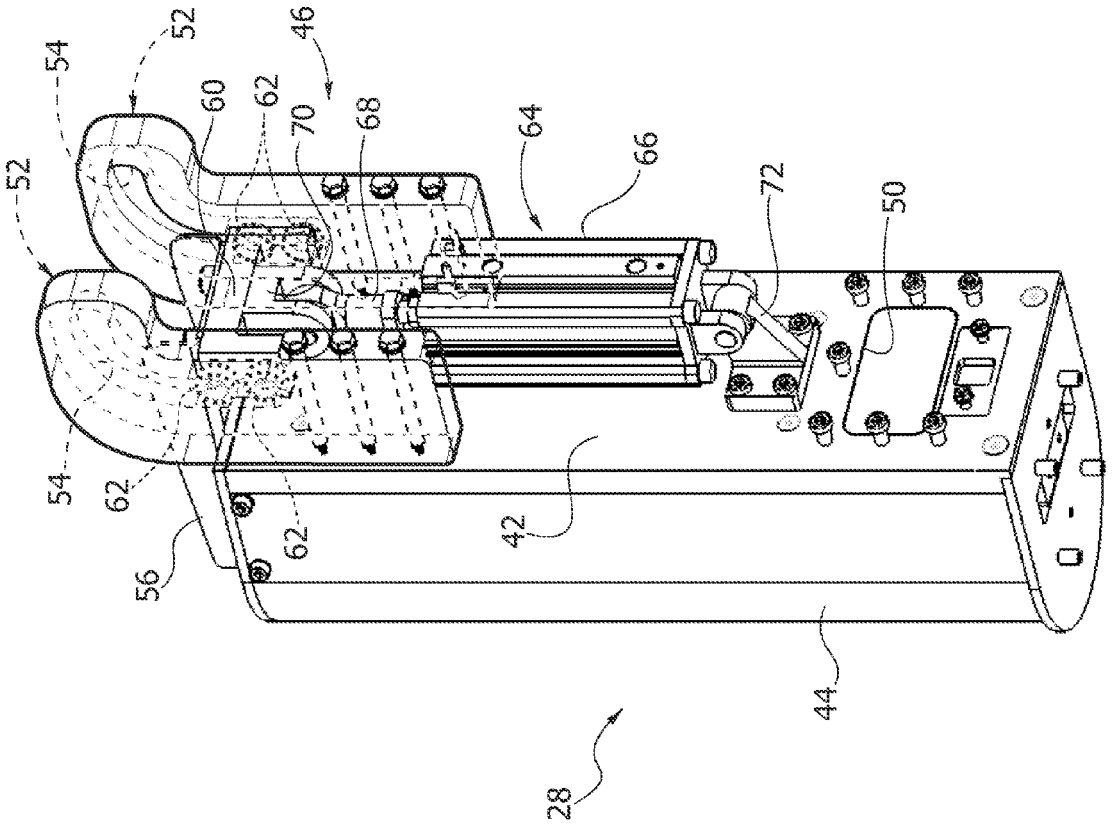
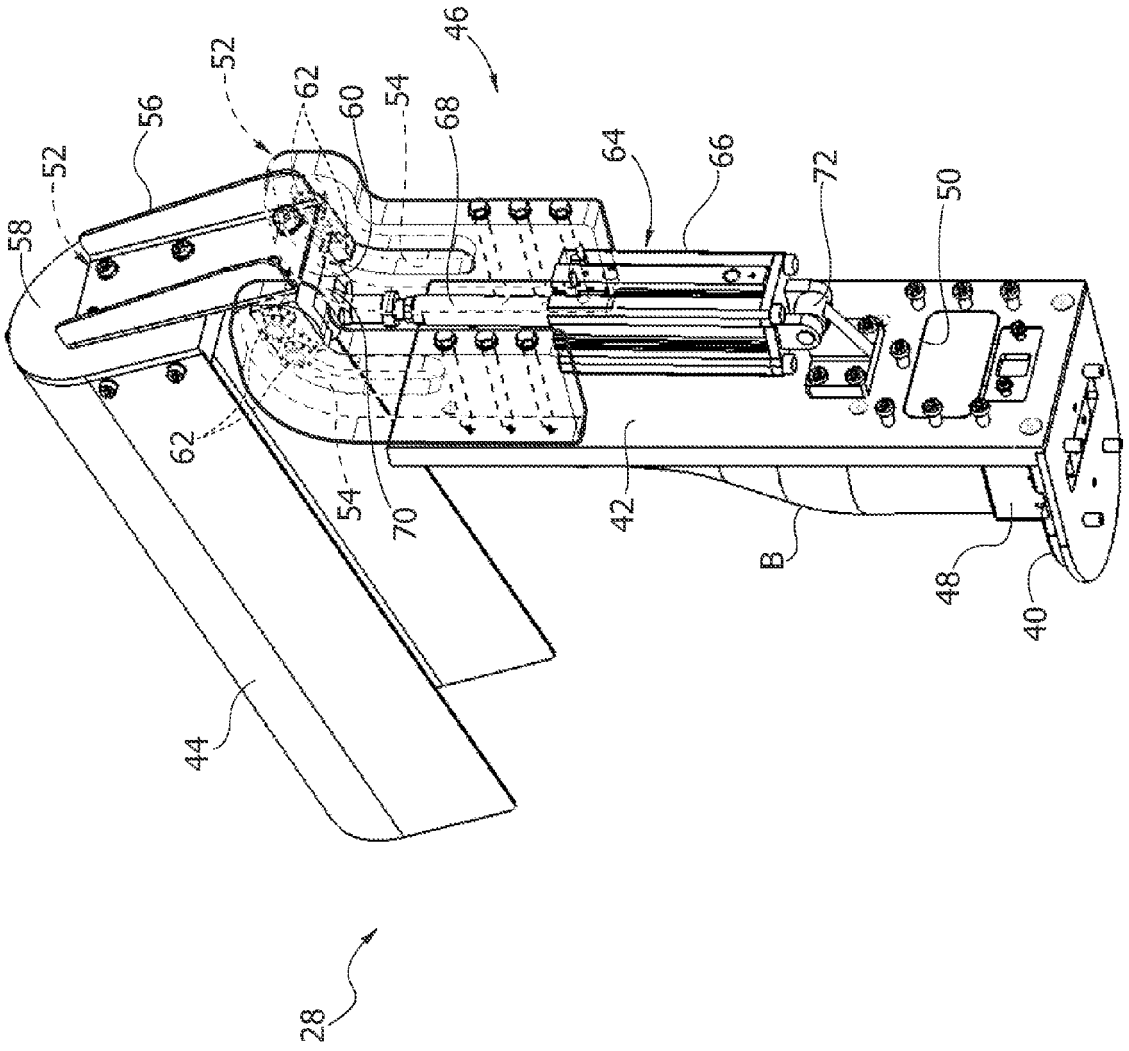


FIG. 6



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 10 18 9680

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	WO 2009/001208 A1 (BOIDO STEFANO [IT]) 31 December 2008 (2008-12-31) * page 7 - page 9; figures 8-9 * -----	1	INV. B65C9/00 F26B3/347 F26B15/04
A	FR 2 406 173 A1 (MANURHIN [FR]) 11 May 1979 (1979-05-11) * page 4, line 20 - page 5, line 35; figures 1-10 * -----	1	F26B15/18

TECHNICAL FIELDS SEARCHED (IPC)

B65C
B65B
F26B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 April 2011	Wartenhorst, Frank

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

2

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 18 9680

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-04-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2009001208 A1	31-12-2008	NONE	
FR 2406173 A1	11-05-1979	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2009001208 A **[0006]**